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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,276	09/10/2003	Yoshinori Nakagawa	012720020630.	2474

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EXAMINER

HAUPT, KRISTY A

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,276

Applicant(s)

NAKAGAWA ET AL.

Examiner

Kristy A. Haupt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 8-12 and 14 is/are rejected.
- 7) ☒ Claim(s) 5, 7, 13, 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

PRIORITY

The Examiner acknowledges the Applicant's request for priority under 35 USC § 120 for Application Number 10/658,276 filed September 12, 2002.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on October 1, 2003 is in compliance with the provisions of 37 CFR 1.97, and accordingly, has been considered by the Examiner.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 11, 6, 14, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaegashi et al. (6,079,809) in view of Rezanka (5,412,410).

With respect to claims 1 and 9, Yaegashi teaches:

- An ink jet printing apparatus for forming an image by ejecting ink from a print head onto a print medium (Column 1, Lines 25-29)
- Supplied from a common ink chamber (Column 8, Lines 59-60)

- A preliminary ejection means for performing ink ejections, not involved in the formation of an image, from the nozzles of the print head (Column 13, Lines 53-55)
- A suction means for sucking out ink from the print head through the nozzles of the print head (Column 7, Lines 43-46)
- A control means for causing the suction means to suck out ink from the print head and then the preliminary ejection means to perform the ink ejections (Figure 7, # 407)
- Wherein, in the ink ejection operation by the preliminary ejection means following the sucking-out of ink by the suction means, the control means causes the nozzles of the same kind to eject ink simultaneously (Figure 10, # S64)
- Controls to set the number of ejections from the nozzles with a large ink ejection volume larger than the number of ejections from the nozzles with a small ink ejection volume (Figure 10, # S65 and # S66)

The Examiner notes that the 2000 shots as referenced in Fig. 10 S65 will produce a larger volume than the 500 shots as referenced in Fig. 10 S66. Therefore, S65 (the large ink ejection volume) is shown ejecting a larger number than S66 (the small ink ejection volume).

Yaegashi fails to explicitly teach “wherein the print head has arrayed in nozzle columns at least two kinds of nozzles that eject different volumes of ink”.

However, Rezanka teaches:

- Wherein the print head has arrayed in nozzle columns (Column 3, Lines 14-16) at least two kinds of nozzles that eject different volumes of ink (Column 3, Lines 5-9) and printhead where the end nozzles are larger in size than some of the nozzles in the middle (Figure 3).

Therefore, it would have been obvious to one skilled in the art to modify the print head in Yaegashi to include at least two kinds of nozzles that eject different volumes of ink in order to improve the quality of the printed image (Column 3, Lines 25-28).

With respect to claims 3 and 11 and incorporating all arguments of claim 1, Yaegashi additionally teaches:

- Wherein the preliminary ejection means executes the ejection operation of the nozzles with a large ink ejection volume before the ejection operation of the nozzles with a small ink ejection volume (Figure 10, # S65 and #S66 where step S65 (large ink ejection volume) precedes step S66 (small ink ejection volume))

With respect to claims 6 and 14 and incorporating all arguments of claim 1, Yaegashi additionally teaches:

- Wherein the print head (Figure 5, # 221) is scanned in a direction different from a direction in which the nozzles are arrayed (Figure 5, # 223 and arrow "y") and, during this scan operation, ejects ink onto a print medium (Column 6, Lines 29-30)
- The nozzles with a large ink ejection volume are made to execute an ejection operation in advance of the nozzles with a small ink ejection volume (Figure 10, # S65 and #S66 where step S65 (large ink ejection volume) precedes step S66 (small ink ejection volume))

However, Yaegashi fails to explicitly teach the following, which are taught in

Rezanka:

- Wherein the at least two kinds of nozzles that eject different volumes of ink (Column 3, Lines 5-9) supplied from the common ink chamber (Column 3, Lines 12-13) are arranged alternately in a direction different from the scan direction of the print head to form nozzle columns (Column 7, Lines 13-19, Figure 8, # 35, #36, #11.)
- The print medium is fed a predetermined distance in a direction different from the scan direction of the print head in a motion relative to the print head, and the print head scan and the print medium feed are alternately performed repetitively to form an image on an entire surface of the print medium (Column 3, Lines 34-40)

Therefore, it would have been obvious to one of ordinary skill in the art to modify the print head of Yaegashi to alternately arrange the different ink ejection volume nozzle columns in a different direction than the scan direction of the printhead in order to allow for the ejections of large and small ink volumes during printing. This would help reduce the scalloping effect along the outer edges that occurs when using only large droplets of ink. (Column 7, Lines 38-39, Figures 10 and 11).

It would also have been obvious to one of ordinary skill in the art to modify the invention in Yaegashi to feed the print medium a predetermined distance in a different direction than the print head scan direction, while alternately and repetitively performing the scan and print medium feed in order to form an image on the entire surface of the print medium as this is the routine operation of a serial printer.

With respect to claim 8 and incorporating all arguments of claim 1, Yaegashi additionally teaches:

- Wherein the nozzles each generate a bubble in ink by thermal energy to eject ink as a droplet with a pressure of the inflating bubble (Columns 5 and 6, Lines 65-4)

3. Claims 4 and as are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaegashi et al. (6,079,809) in view of Rezanka (5,412,410) as applied to claims 1 and 9 above, and further in view of Suzuki (US 2001/0005210 A1).

Yaegashi in view of Rezanka teaches all claimed features except:

- Wherein the preliminary ejection means sets an ejection frequency of the nozzles with a small ink ejection volume lower than an ejection frequency of the nozzles with a large ink ejection volume

Meanwhile, Suzuki teaches wherein the preliminary ejection means sets an ejection frequency of the nozzles with a small ink ejection volume lower than an ejection frequency of the nozzles with a large ink ejection volume (Page 3, Paragraph 0037).

Therefore, it would have been obvious to one skilled in the art to modify Yaegashi to set the frequency of ejection for the small ink volume lower than the large ink volume for the purpose of reducing the volume of waste ink (Page 6, Paragraph 0088).

4. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaegashi et al. (6,079,809) in view of Rezanka (5,412,410) and Suzuki (US 2001/0005210 A1).

With respect to claims 2 and 10, Yaegashi teaches:

- An ink jet printing apparatus for forming an image by ejecting ink from a print head onto a print medium (Column 1, Lines 25-29)
- Supplied from a common ink chamber (Column 8, Lines 59-60)
- A preliminary ejection means for performing ink ejections, not involved in the formation of an image, from the nozzles of the print head (Column 13, Lines 53-55)
- A suction means for sucking out ink from the print head through the nozzles of the print head (Column 7, Lines 43-46)
- A control means for causing the suction means to suck out ink from the print head and then the preliminary ejection means to perform the ink ejections (Figure 7, # 407)
- Wherein, in the ink ejection operation by the preliminary ejection means following the sucking-out of ink by the suction means, the control means causes the nozzles of the same kind to eject ink simultaneously (Figure 10, # S64)

Yaegashi fails to explicitly teach “wherein the print head has arrayed in nozzle columns at least two kinds of nozzles that eject different volumes of ink”.

However, Rezanka teaches:

- Wherein the print head has arrayed in nozzle columns (Column 3, Lines 14-16) at least two kinds of nozzles that eject different volumes of ink (Column 3, Lines 5-9)

Therefore, it would have been obvious to one skilled in the art to modify the print head in Yaegashi to include at least two kinds of nozzles that eject different volumes of ink in order to eject a large and a small ink volume. By having more than one nozzle column with at least two kinds of nozzles ejecting different volumes of ink, the print speed and print quality can be improved.

Yaegashi also fails to explicitly teach "Controls to set the frequency at which to eject ink from the nozzles with a small ink ejection volume lower than a frequency at which to eject ink from the nozzles with a large ink ejection volume"

However, Suzuki teaches:

- Controls to set the frequency at which to eject ink from the nozzles with a small ink ejection volume lower than a frequency at which to eject ink from the nozzles with a large ink ejection volume (Page 3, Paragraph 0037)

Therefore, it would have been obvious to one skilled in the art to modify Yaegashi to set the frequency of ejection for the small ink volume lower than the

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large ink volume. . By doing so, the volume of the waste ink may be reduced

(Page 6, Paragraph 0088)

Allowable Subject Matter

1. Claims 5,7,13, and15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record fails to provide sufficient teaching or motivation to one of ordinary skill in the inkjet art to provide the additionally recited features of these claims in the combinations as claimed.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication from the Examiner should be directed to Kristy A. Haupt whose telephone number is (571) 272-8545. The Examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149.

KAH


LAMSON NGUYEN
PRIMARY EXAMINER
04/01/05